Table 1 - Unit Operations (X if present)

Activated	Trickling	Nitrification	Anaerobic	Sludge
Sludge	Filter	Present?	Digestion	Incineration
Present?	Present?		Present?	Present?
X			X	

Placing an "X" in the cell under a treament unit will activate the inhibition calclations for that unit or the sludge incineration calculations.

#### **TABLE 2a - Stream Flow Partial Mix Factors**

Q7-10 Stream Flow	Harmonic Mean Stream Flow	Drinking Water Intake Stream Flow	Chronic Partial Mix Factor	Acute Partial Mix Factor	Cancer Risk Level Partial Mix Factor
(MGD)	(MGD)	(MGD)	i artiar wix i actor	i aitiai wix i actoi	i artiar iviix i actor
(Q7-10)	(Qhm)	(Qdw)	(PMFc)	(PMFa)	(PMFcrl)
1874	5099	0.073	0.508	0.073	0.706

7-day, 10-year low flow for receiving stream in MGD (user entered).

Harmonic mean flow for receiving stream in MGD (user entered).

Flow for receiving stream at nearest downstream drinking water intake (user entered).

Partial mix factor for acute water quality standards (user entered).

Partial mix factor for chronic water quality standards (user entered).

Partial mix factor for cancer risk level water quality standards (user entered).

#### TABLE 2b - POTW and Receiving Stream Data

Γ	POTW	IU	Sludge Flow	Sludge Flow	Stream Flow for	Stream Flow for	Stream Flow for	Stream Flow for	Receiving Stream	Hauled Waste	Hauled Waste	Sludge Flow
	Flow	Flow	to Digester	to Disposal	Chronic WQS	Acute WQS	Threshold	Carcinogen	Hardness	Flow to Influent	Flow to	to Incineration
	(MGD)	(MGD)	(MGD)	(MTD)	(MGD)	(MGD)	Human Health WQS	Human Health WQS	(mg/l)	(MGD)	Sludge Processing	(MTD)
	(Qpotw)	(Qind)	(Qdig)	(Qsldg)	(Qstr1)	(Qstr2)	(MGD)	(MGD)	(H)	(Qhwi)	(MGD)	(Qinc)
							(Qstr3)	(Qstr4)			(Qhws)	
	5.874	0.367	0.037	0.91	951.99	136.80	1874.00	3599.89	122	0	0	0

POTW's average flow in MGD (user entered).

(Q7-10)

(Qhm)

(Qdw)

(PMFa)

(PMFc)

(PMFcrl)

(Qpotw)

(Qind)

(Qdiq)

(Qsldg)

(Qstr1)

(Qstr2)

(Qstr3) (Qstr4)

Qstr4 =

(Qhwi)

or Qstr4 = (H)

Qstr1 =

Qstr2 =

Average discharge flow of Industrial Users to be regulated through the local limits in MGD (user entered).

Average sludge flow to digester in MGD (user entered).

Average sludge flow to disposal in dry metric tons per day (user entered).

Receiving stream (upstream) flow used with chronic water quality standards in MGD (calculated).

Q7-10 \* PMFc (data from Table 2(a), cells B17 and E17); if cell E17 is blank, PMFc assumed to be 1.

Receiving stream (upstream) flow used with acute water quality standards in MGD (calculated).

Q7-10 \* PMFa (data from Table 2(a), cells B17 and F17); if cell F17 is blank, PMFa assumed to be 1.

Receiving stream (upstream) flow used with threshold human health water quality standards in MGD (from Table 2(a), cell B17).

Receiving stream (upstream) flow used with carcinogen human health water quality standards in MGD (calculated).

Qhm \* PMFcrl (data from Table 2(a), cells C17 and G17); if cell G17 is blank, PMFcrl assumed to be 1; if cell C17 is blank, formula below is used:

PMFcrl \* 7.43 \* (Q7-10)<sup>0.874</sup> (data from Table 2(a), cell G17 and B17)

Receiving stream hardness in mg/l (user entered).

Hauled waste flow discharged at the influent of the treatment plant in MGD (user entered).

(Qhws) Hauled waste flow discharged directly to the sludge processing units in MGD (user entered).

(Qinc) Average sludge flow to incineration in dry metric tons per day (user entered).

TABLE 3 - Allowable Headworks Loadings Based on NPDES Effluent Limits

	LOCAL LIMITS CALC	ULATION DATA			MAXIMUM LOADING	
Pollutant	POTW Flow (MGD) (Qpotw)	NPDES Limit (mg/l) (Ccrit)	Select Removal Efficiency (from list)	Removal Efficiency (%) (Rpotw)	Allowable Headworks Loading (lbs/day) (AHLnpdes)	User Entered Removal Efficiency (%)
Arsenic	5.874		Influent/Sludge	26.46	-	
Cadmium	5.874		Influent/Sludge	34.70	-	
Chromium	5.874		Influent/Effluent	81.36	-	
Copper	5.874		Influent/Effluent	79.50	-	
Cyanide	5.874		Default (activated sludge)	69.00	-	
Lead	5.874		Influent/Effluent	75.75	-	
Mercury	5.874		Default (activated sludge)	60.00	-	
Molybdenum	5.874		User Entered	17.00	-	16.9986719
Nickel	5.874		Influent/Effluent	69.11	-	
Selenium	5.874		User Entered	3.17	-	3.17241379
Silver	5.874		Default (activated sludge)	75.00	-	
Zinc	5.874		Influent/Sludge	44.23	-	
Ammonia	5.874		Influent/Effluent	-	-	
BOD	5.874		Influent/Effluent	91.25	-	
TSS	5.874		Influent/Effluent	84.38	-	
Phosphorus (T)	5.874		Influent/Effluent	-	-	
Nitrogen (T)	5.874		Influent/Effluent	-	-	
Beryllium	5.874		Influent/Effluent	-	-	
	5.874		Influent/Effluent	-	-	
	5.874		Influent/Effluent	-	-	
	5.874		Influent/Effluent	-	-	
	5.874		Influent/Effluent	-	-	
	5.874		Influent/Effluent	-	-	
	5.874		Influent/Effluent	-	-	
	5.874		Influent/Effluent	-	-	
	5.874		Influent/Effluent	-	-	
	5.874		Influent/Effluent	-	-	
	5.874		Influent/Effluent	-	-	
	5.874		Influent/Effluent	-	-	
	5.874		Influent/Effluent	-	-	
	5.874		Influent/Effluent	-	-	
	5.874		Influent/Effluent	-	-	
	5.874		Influent/Effluent	-	-	
	5.874		Influent/Effluent	-	-	
	5.874		Influent/Effluent	-	-	
	5.874		Influent/Effluent	-	-	
	5.874		Influent/Effluent	-	-	

(Qpotw) POTW's average flow in MGD (from Table 2(b), cell B34).

(Ccrit) NPDES permit limit or calculated WQBEL for a particular pollutant in mg/l (user entered) Select Removal Efficiency

Select removal efficiency for column E from drop down list.

Removal efficiency across POTW as percent (Inf/Eff Removal (row 48), Inf/Sldg Removal (row 49), or Daily Removal (row 43) from 'Monitoring Data' worksheet, EPA default for specified treatment process, or user entered (column G)).

Allowable headworks pollutant loading to the POTW in pounds per day based on NPDES permit limits (lbs/day - calculated).

AHLnpdes = (8.34 \* Ccrit \* Qpotw) / (1-Rpotw/100)

8.34 Unit conversion factor

(Rpotw)

(AHLnpdes)

TABLE 4 - Allowable Headworks Loadings Based on Chronic Water Quality Standards

	LOCAL LIMITS CAL	CULATION DATA				MAXIMUM
						LOADING
	POTW	Receiving	Receiving Stream	Chronic	Removal	Allowable
Pollutant	Flow	Stream Flow	Concentration	WQS	Efficiency	Headworks Loading
	(MGD)	(MGD)	(mg/l)	(mg/l)	(%)	(lbs/day)
	(Qpotw)	(Qstr1)	(Cstr)	(Ccrit)	(Rpotw)	(AHLcwq)
Arsenic	5.874	951.99		0.15000	26.46	1629.4525
Cadmium	5.874	951.99		0.00031	34.70	3.8363
Chromium	5.874	951.99			81.36	-
Copper	5.874	951.99		0.01106	79.50	430.9529
Cyanide	5.874	951.99		0.00520	69.00	134.0024
Lead	5.874	951.99		0.00410	75.75	135.0005
Mercury	5.874	951.99		0.00091	60.00	18.1741
Molybdenum	5.874	951.99			17.00	
Nickel	5.874	951.99		0.06172	69.11	1595.9131
Selenium	5.874	951.99		0.005	3.17	41.2517
Silver	5.874	951.99			75.00	•
Zinc	5.874	951.99		0.14180	44.23	2031.2830
Ammonia	5.874	951.99			-	
BOD	5.874	951.99			91.25	
TSS	5.874	951.99			84.38	-
Phosphorus (T)	5.874	951.99			-	-
Nitrogen (T)	5.874	951.99			-	
Beryllium	5.874	951.99			-	•
	5.874	951.99			-	-
	5.874	951.99			-	-
	5.874	951.99			=	-
	5.874	951.99			-	-
	5.874	951.99			-	-
	5.874	951.99			-	-
	5.874	951.99			=	-
	5.874	951.99			=	-
	5.874	951.99			=	-
	5.874	951.99			-	-
	5.874	951.99			=	-
	5.874	951.99			=	-
	5.874	951.99			-	-
	5.874	951.99			-	-
	5.874	951.99			-	-
	5.874	951.99			-	-
	5.874	951.99			-	-
	5.874	951.99			-	
	5.874	951.99			-	-

(Qpotw) (Qstr1) POTW's average flow in MGD (from Table 2(b), cell B34).

Receiving stream (upstream) flow used with chronic water quality standards in MGD (from Table 2(b), cell F34).

(Cstr) (Ccrit)

Receiving stream background concentration in mg/l (user entered)

State chronic water quality standard for a particular pollutant in mg/l (from PADEP Chapter 98.3c Table 5 or user entered)

(Rpotw) Removal efficiency across POTW as percent (from Table 3, column E).

(AHLcwq) Allowable headworks pollutant loading to the POTW in pounds per day based on chronic water quality standards (lbs/day - calculated).

AHLcwq = 8.34 \* (Ccrit \* (Qstr1 + Qpotw) - (Cstr \* Qstr1)) / (1-Rpotw/100)

8.34 Unit conversion factor

TABLE 5 - Allowable Headworks Loadings Based on Acute Water Quality Standards

	LOCAL LIMITS CAL	CULATION DATA				MAXIMUM
						LOADING
	POTW	Receiving	Receiving Stream	Acute	Removal	Allowable
Pollutant	Flow	Stream Flow	Concentration	WQS	Efficiency	Headworks Loading
	(MGD)	(MGD)	(mg/l)	(mg/l)	(%)	(lbs/day)
	(Qpotw)	(Qstr2)	(Cstr)	(Ccrit)	(Rpotw)	(AHLawq)
Arsenic	5.874	136.80	0		26.46	
Cadmium	5.874	136.80	0	0.00261	34.70	4.7581
Chromium	5.874	136.80	0		81.36	-
Copper	5.874	136.80	0		79.50	98.0208
Cyanide	5.874	136.80	0		69.00	84.4458
Lead	5.874	136.80	0	******	75.75	516.0207
Mercury	5.874	136.80	0		60.00	4.9084
Molybdenum	5.874	136.80	0		17.00	
Nickel	5.874	136.80	0	0.55513	69.11	2138.0934
Selenium	5.874	136.80	0		3.17	-
Silver	5.874	136.80	0		75.00	25.3580
Zinc	5.874	136.80	0	0.14180	44.23	302.5635
Ammonia	5.874	136.80	0		1	-
BOD	5.874	136.80	0		91.25	-
TSS	5.874	136.80	0		84.38	-
Phosphorus (T)	5.874	136.80	0		-	-
Nitrogen (T)	5.874	136.80	0		1	-
Beryllium	5.874	136.80	0		1	-
	5.874	136.80	0		1	-
	5.874	136.80	0		-	-
	5.874	136.80	0		-	-
	5.874	136.80	0		-	-
	5.874	136.80	0		-	-
	5.874	136.80	0		-	-
	5.874	136.80	0		-	-
	5.874	136.80	0		-	-
	5.874	136.80	0		-	-
	5.874	136.80	0		-	-
	5.874	136.80	0		-	-
	5.874	136.80	0		-	-
	5.874	136.80	0		-	-
	5.874	136.80	0		-	-
	5.874	136.80	0		-	-
	5.874	136.80	0		-	-
	5.874	136.80	0		-	-
	5.874	136.80	0		-	-
	5.874	136.80	0		-	-

(Qpotw) (Qstr2) POTW's average flow in MGD (from Table 2(b), cell B34).

Receiving stream (upstream) flow used with acute water quality standards in MGD (from Table 2(b), cell G34).

(Cstr) (Ccrit)

Receiving stream background concentration in mg/l (from Table 4, column D).

State acute water quality standard for a particular pollutant in mg/l (from PADEP Chapter 98.3c Table 5 or user entered)

(Rpotw) Removal efficiency across POTW as percent (from Table 3, column E).

(AHLawq) Allowable headworks pollutant loading to the POTW in pounds per day based on acute water quality standards (lbs/day - calculated).

8.34 \* (Ccrit \* (Qstr2 + Qpotw) - (Cstr \* Qstr2)) / (1-Rpotw/100) AHLawq =

8.34 Unit conversion factor

TABLE 6 - Allowable Headworks Loadings Based on Human Health Water Quality Standards

	LOCAL LIMITS CA	LCULATION DATA					MAXIMUM LOADING
Pollutant	POTW Flow (MGD) (Qpotw)	Receiving Stream Flow (MGD) (Qstr3 Qstr4 or Qdw)	Receiving Stream Concentration (mg/l) (Cstr)	Human Health WQS (mg/l) (Ccrit)	Select Basis of Standard (from list)	Removal Efficiency (%) (Rpotw)	Allowable Headworks Loading (lbs/day) (AHLhhwq)
Arsenic	5.874	1874.00	0	0.01	Threshold Human Health	26.46	213.1937
Cadmium	5.874		0			34.70	
Chromium	5.874	-	0			81.36	
Copper	5.874		0			79.50	
Cyanide	5.874		0	0.14	Threshold Human Health	69.00	
Lead	5.874		0			75.75	
Mercury	5.874		0	0.00005	Threshold Human Health	60.00	
Molybdenum	5.874		0			17.00	
Nickel	5.874		0	0.61	Threshold Human Health	69.11	30955.6438
Selenium	5.874		0			3.17	
Silver	5.874		0			75.00	-
Zinc	5.874		0			44.23	-
Ammonia	5.874		0			-	-
BOD	5.874		0			91.25	-
TSS	5.874		0			84.38	-
Phosphorus (T)	5.874		0			-	-
Nitrogen (T)	5.874		0			-	-
Beryllium	5.874		0			-	-
	5.874		0			-	-
	5.874		0			-	-
	5.874		0			-	-
	5.874		0			=	-
	5.874		0			-	-
	5.874		0			-	-
	5.874		0			-	-
	5.874		0			-	-
	5.874		0			-	-
	5.874		0			-	-
	5.874		0			-	-
	5.874		0			-	-
	5.874		0			-	-
	5.874		0			-	-
	5.874		0			-	-
	5.874		0			-	-
	5.874		0			-	-
	5.874		0			-	-
	5.874	-	0			-	-

POTW's average flow in MGD (from Table 2(b), cell B34). (Qpotw)

(Qstr3) Receiving stream (upstream) flow used with threshold human health water quality standards in MGD (from Table 2(b), cell H34). (Qstr4) Receiving stream (upstream) flow used with cancer risk level human health water quality standards in MGD (from Table 2(b), cell 136). (Qdw)

Receiving stream (upstream) flow used with water quality standards based on drinking water supply in MGD (from Table 2(a), cell D17).

Receiving stream background concentration in mg/l (from Table 4, column D).

State human health water quality standard for a particular pollutant in mg/l (from PADEP Chapter 98.3c Table 5 or user entered).

Select Basis of Standard Select the basis of the standard listed in column E from drop down list. Selection of basis of the standard will determine which flow is entered in column C (Qstr3, Qstr4, or Qdw). (Rpotw)

Removal efficiency across POTW as percent (from Table 3, column E).

Allowable headworks pollutant loading to the POTW in pounds per day based on human health water quality standards (lbs/day - calculated).

8.34 \* (Ccrit \* (Q + Qpotw) - (Cstr \* Q)) / (1-Rpotw/100); where Q is Qstr3, Qstr4, or Qdw

8.34 Unit conversion factor

(Cstr)

(Ccrit)

(AHLhhwq)

ÀHLhhwq" =

TABLE 7 - Comparison of Allowable Headworks Loadings Based on Water Quality

	AHL	AHL	AHL	AHL	AHL
Pollutant	(NPDES)	(CHRONIC)	(ACUTE)	(HUMAN HEALTH)	(WATER QUALITY)
	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)
Arsenic	-	1629.4525	550.1429	213.1937	213.1937
Cadmium	-	3.8363	4.7581	-	3.8363
Chromium	-	-	-	-	-
Copper	-	430.9529	98.0208	-	98.0208
Cyanide	-	134.0024	84.4458	7080.4545	84.4458
Lead	-	135.0005	516.0207	-	135.0005
Mercury	-	18.1741	4.9084	1.9598	1.9598
Molybdenum	-	-	-	-	-
Nickel	-	1595.9131	2138.0934	30955.6438	1595.9131
Selenium	-	41.2517	-	-	41.2517
Silver	-	-	25.3580	-	25.3580
Zinc	-	2031.2830	302.5635	-	302.5635
Ammonia	-	-	-	-	-
BOD	-	-	•		
TSS	-	-	•		
Phosphorus (T)	-	-	-	-	-
Nitrogen (T)	-	-	-	-	-
Beryllium	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	=	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-

AHL (NPDES) = AHL (CHRONIC) = AHL (ACUTE) = AHL (HUMAN HEALTH) = AHL (WATER QUALITY) =

Allowable headworks loading based on NPDES limits, from Table 3, column F.

Allowable headworks loading based on chronic water quality criteria, from Table 4, column G.

Allowable headworks loading based on acute water quality criteria, from Table 5, column G.

Allowable headworks loading based on human health water quality criteria, from Table 6, column H.

Allowable headworks loading based on water quality; lowest value from columns B through E for each pollutant.

TABLE 8 - Allowable Headworks Loadings Based on Activated Sludge Inhibition Level

	LOCAL LIMITS CAI	CULATIONS DATA			MAXIMUM LOADING	
Pollutant	POTW Flow (MGD) (Qpotw)	Activated Sludge Inhibition Level (mg/l) (Ccrit)	Select Removal Efficiency (from list)	Removal Efficiency (%) (Rprim)	Allowable Headworks Loading (lbs/day) (AHLasi)	User Entered Removal Efficiency (%)
Arsenic	5.874	0.1	User Entered	0.00	4.8989	\ /
Cadmium	5.874		Default (Through Primary)	15.00	57.6343	
Chromium	5.874		Default (Through Primary)	27.00	67.1084	
Copper	5.874	1	Default (Through Primary)	22.00	62.8066	
Cyanide	5.874	0.1	Default (Through Primary)	27.00	6.7108	
Lead	5.874	1	Default (Through Primary)	57.00	113.9283	
Mercury	5.874		Default (Through Primary)	10.00	5.4432	
Molybdenum	5.874		User Entered	-	-	
Nickel	5.874	1	Default (Through Primary)	14.00	56.9641	
Selenium	5.874		User Entered	-	-	
Silver	5.874	0.25	Default (Through Primary)	20.00	15.3091	
Zinc	5.874	0.3	Default (Through Primary)	27.00	20.1325	
Ammonia	5.874	480	User Entered	0.00	23514.7968	
BOD	5.874		User Entered	-	-	
TSS	5.874		User Entered	-	-	
Phosphorus (T)	5.874		User Entered	-	-	
Nitrogen (T)	5.874		User Entered	-	-	
Beryllium	5.874		User Entered	-	-	
*	5.874		User Entered	-	-	
	5.874		User Entered	-	-	
	5.874		User Entered	-	-	
	5.874		User Entered	-	-	
	5.874		User Entered	-	-	
	5.874		User Entered	-	-	
	5.874		User Entered	-	-	
	5.874		User Entered	-	-	
	5.874		User Entered	-	-	
	5.874		User Entered	-	-	
	5.874		User Entered	-	-	
	5.874		User Entered	-	-	
	5.874		User Entered	-	-	
	5.874		User Entered	-	-	
	5.874		User Entered	-	-	
	5.874		User Entered	-	-	
	5.874		User Entered	-	-	
	5.874		User Entered	-	-	
	5.874		User Entered	-	-	

(Qpotw) POTW's average flow in MGD (from Table 2(b), cell B34).

(Ccrit)
Select Removal Efficiency Activated sludge threshold inhibition level, mg/l (EPA default or user entered).

Select removal efficiency for column E from drop down list.

Removal efficiency prior to activated sludge treatment unit as percent (Prior to Act SI ('Inhibition Removals' worksheet row 48), EPA default, or user entered).

Allowable headworks pollutant loading to the POTW in pounds per day based on inhibition of activated sludge units (lbs/day - calculated).

AHLasi = 8.34 \* (Ccrit \* Qpotw) / (1-Rprim/100)

8.34 Unit conversion factor

(Rprim)

(AHLasi)

TABLE 9 - Allowable Headworks Loadings Based on Trickling Filter Inhibition Level

	LOCAL LIMITS CAL	CULATIONS DATA			MAXIMUM LOADING	
Pollutant	POTW Flow (MGD) (Qpotw)	Trickling Filter Inhibition Level (mg/l) (Ccrit)	Select Removal Efficiency (from list)	Removal Efficiency (%) (Rprim)	Allowable Headworks Loading (lbs/day) (AHLtfi)	User Entered Removal Efficiency (%)
Arsenic	5.874	` '	User Entered	-	- ` '	` '
Cadmium	5.874		Default (Through Primary)	-	-	
Chromium	5.874	-	Default (Through Primary)	-	-	
Copper	5.874		Default (Through Primary)	-	-	
Cyanide	5.874	-	Default (Through Primary)	-	-	
Lead	5.874		Default (Through Primary)	-	-	
Mercury	5.874		Default (Through Primary)	-	-	
Molybdenum	5.874		User Entered	-	-	
Nickel	5.874		Default (Through Primary)	-	-	
Selenium	5.874		User Entered	-	-	
Silver	5.874		Default (Through Primary)	-	-	
Zinc	5.874		Default (Through Primary)	-	-	
Ammonia	5.874		User Entered	-	-	
BOD	5.874		User Entered	-	-	
TSS	5.874		User Entered	-	-	
Phosphorus (T)	5.874		User Entered	-	-	
Nitrogen (T)	5.874		User Entered	-	-	
Beryllium	5.874		User Entered	-	-	
	5.874		User Entered	-	-	
	5.874		User Entered	-	-	
	5.874		User Entered	-	-	
	5.874		User Entered	-	-	
	5.874		User Entered	-	-	
	5.874		User Entered	-	-	
	5.874		User Entered	-	-	
	5.874		User Entered	-	-	
	5.874		User Entered	-	-	
	5.874		User Entered	-	-	
	5.874		User Entered	-	-	
	5.874		User Entered	-	-	
	5.874		User Entered	-	-	
	5.874		User Entered	-	-	
	5.874		User Entered	-	-	
	5.874		User Entered	-	-	
	5.874		User Entered	-	-	
	5.874		User Entered	-	-	
	5.874		User Entered	-	-	

(Qpotw) POTW's average flow in MGD (from Table 2(b), cell B34).

(Ccrit)
Select Removal Efficiency Trickling filter threshold inhibition level, mg/l (EPA default or user entered).

Select removal efficiency for column E from drop down list.

Removal efficiency prior to trickling filter treatment unit as percent (Prior to Trick Fil ('Inhibition Removals' worksheet row 49), EPA default, or user entered).

Allowable headworks pollutant loading to the POTW in pounds per day based on inhibition of trickling filter units (lbs/day - calculated).

(AHLtfi) AHLtfi = 8.34 \* (Ccrit \* Qpotw) / (1-Rprim/100)

8.34 Unit conversion factor

(Rprim)

TABLE 10 - Allowable Headworks Loadings Based on Nitrification Inhibition Level

LOCAL LIMITS CAL	LOCAL LIMITS CALCULATIONS DATA				
					User Entered
					Removal
					Efficiency
	(Ccrit)		(Rsec)	` ′	(%)
	-		-	-	
	-		-	-	
	-		-	-	
	-		-	-	
	-		-	-	
	-		-	-	
5.874			-	-	
5.874			-	-	
5.874	-	Default (Through Primary)	-	-	
5.874		User Entered	=	-	
5.874		Default (Through Primary)	-	=	
5.874	-	Default (Through Primary)	=	-	
5.874		User Entered	-	=	
5.874		User Entered	-	-	
5.874		User Entered	-	-	
5.874		User Entered	-	-	
5.874		User Entered	-	-	
5.874		User Entered	-	-	
5.874		User Entered	-	-	
5.874		User Entered	-	-	
5.874		User Entered	-	-	
5.874		User Entered	-	-	
5.874		User Entered	-	-	
5.874		User Entered	-	-	
5.874		User Entered	-	-	
5.874		User Entered	-	-	
5.874		User Entered	-	-	
5.874		User Entered	-	-	
5.874		User Entered	-	-	
5.874			-	-	
5.874		User Entered	-	-	
5.874			-	-	
5.874			-	-	
			-	-	
			_	<u> </u>	
			_	-	
			_	-	
	POTW Flow (MGD) (Qpotw) 5.874	POTW Flow (MGD) (Qpotw)	POTW   Nitrification   Removal	POTW   Nitrification   Select   Removal   Efficiency   (MGD)   (mg/l)   (Corit)   (Ifform list)   (Rsec)   (%)   (Rsec)   (%)   (Gotw)   (Corit)   (Ifform list)   (Rsec)   (%)   (Rsec)   (Rs	POTW

(Qpotw) POTW's average flow in MGD (from Table 2(b), cell B34).

(Ccrit) Select Removal Efficiency Nitrification threshold inhibition level, mg/l (EPA default or user entered).

Select removal efficiency for column E from drop down list. (Rsec)

Removal efficiency prior to nitrification treatment unit as percent (Prior to Nitrif ('Inhibition Removals' worksheet row 50), Prior to Act SI (row 48), Prior to Trick Fil (row 49), EPA default, or user entered).

Allowable headworks pollutant loading to the POTW in pounds per day based on inhibition of nitrification units (lbs/day - calculated).

(AHLni) AHLni = (8.34 \* Ccrit \* Qpotw) / (1-Rsec/100)

8.34 Unit conversion factor

TABLE 11 - Allowable Headworks Loadings Based on Anaerobic Digester Inhibition Level (Conservative Pollutants)

	LOCAL LIMITS CALC	CULATIONS DATA			MAXIMUM LOADING
Pollutant	POTW Flow (MGD) (Qpotw)	Sludge Flow to Digester (MGD) (Qdig)	Anaerobic Digester Inhibition Level (mg/l) (Ccrit)	Removal Efficiency (%) (Rpotw)	Allowable Headworks Loading (lbs/day) (AHLadi)
Arsenic	5.874	0.037	1.6	26.46	1.8659
Cadmium	5.874	0.037	20	34.70	17.7848
Chromium	5.874	0.037	130	81.36	49.3077
Copper	5.874	0.037	40	79.50	15.5252
Cyanide	5.874	0.037		-	-
Lead	5.874	0.037	340	75.75	138.5050
Mercury	5.874	0.037		-	-
Molybdenum	5.874	0.037		-	-
Nickel	5.874	0.037	10	69.11	4.4654
Selenium	5.874	0.037		-	-
Silver	5.874	0.037	13	75.00	5.3487
Zinc	5.874	0.037	400	44.23	279.0594
Ammonia	5.874	0.037		-	
BOD	5.874	0.037			
TSS	5.874	0.037		-	-
Phosphorus (T)	5.874	0.037		-	-
Nitrogen (T)	5.874	0.037		-	
Beryllium	5.874	0.037		-	-
•	5.874	0.037		-	-
	5.874	0.037		-	-
	5.874	0.037		-	-
	5.874	0.037		-	-
	5.874	0.037		-	-
	5.874	0.037		-	-
	5.874	0.037		-	-
	5.874	0.037		-	-
	5.874	0.037		-	-
	5.874	0.037		-	-
	5.874	0.037		-	-
	5.874	0.037		-	-
	5.874	0.037		-	-
	5.874	0.037		-	-
	5.874	0.037		-	-
	5.874	0.037		-	-
	5.874	0.037		-	-
	5.874	0.037		-	-
	5.874	0.037		-	-

POTW's average flow in MGD (from Table 2(b), cell B34).

(Qpotw) (Qdig) (Ccrit) Average sludge flow to digester in MGD (from Table 2(b), cell D34).

Anaerobic digester threshold inhibition level in mg/l (EPA default or user entered).

Removal efficiency across POTW as percent (from Table 3, column E).

(Rpotw) (AHLadi) AHLadi = Allowable headworks pollutant loading to the POTW in pounds per day based on inhibition of anaerobic digester units (lbs/day - calculated).

(8.34 \* Ccrit \* Qdig) / (Rpotw/100)

8.34 Unit conversion factor

TABLE 12 - Allowable Headworks Loadings Based on Anaerobic Digester Inhibition Level (Non-Conservative Pollutants)

	LOCAL LIMITS CAI	CULATIONS DATA				MAXIMUM
						LOADING
	POTW	Average Influent	Average	Digester Pollutant	Anaerobic Digester	Allowable
Pollutant	Flow	Concentration	Influent Load	Concentration	Inhibition Level	Headworks Loading
	(MGD)	(mg/l)	(lbs/day)	(mg/l)	(mg/l)	(lbs/day)
	(Qpotw)	(Cinf)	(Linf)	(Cdig)	(Ccrit))	(AHLadi)
Cyanide	5.874	0.00	0.1421	0.0654		2.1723
Ammonia	5.874	-	-	-	1500	-
BOD	5.874	80.155				-
TSS	5.874	98.095	4805.6033	-		-
Nitrogen (T)	5.874	-	-	-		-
	5.874	-	-	-		-
	5.874	-	-	-		-
	5.874	-	-	-		-
	5.874	-	-	-		-
	5.874	-	-	-		-
	5.874	-	-	-		-
	5.874	-	-	-		-
	5.874	-	-	-		-
	5.874	-	-	-		-
	5.874	-	-	-		-
	5.874	-	-	-		-
	5.874	-	-	-		-
	5.874	-	-	-		-
	5.874	-	-	-		-
	5.874	-	-	-		-
	5.874	-	-	-		-
	5.874	-	-	-		
	5.874	•	-	-		•
	5.874	-	-	-		-

POTW's average flow in MGD (from Table 2(b), cell B34).
POTW's average influent concentration in mg/l (from 'Monitoring Data' worksheet, row 43 or user entered).

POTW's average influent loading in pounds per day (lbs/day - calculated).

(Qpotw) (Cinf) (Linf) Linf = 8.34 \* Cinf \* Qpotw 8.34 Unit conversion factor

(Cdig) (Ccrit) Average pollutant concentration in sludge sent to the digester in mg/l (from 'Inhibition Removals' worksheet row 43 or user entered).

Anaerobic digester threshold inhibition level in mg/l (EPA default or user entered).

(AHLadi) Allowable headworks pollutant loading to the POTW in pounds per day based on inhibition of anaerobic digester units (lbs/day - calculated).

AHLadi = Linf \* (Ccrit/Cdig)

TABLE 13 - Comparison of Allowable Headworks Loadings Based on Inhibition

Has the POTW Experienced Inhibition or Construction Within the Data Time Frame?

						Most	Monitoring Data	Other	Maximum	
Pollutant	AHL	AHL	AHL	AHL	AHL	Stringent	Maximum Influent	Maximum Influent	Influent	AHL
	(ACT. SLUDGE)	(TRICK. FILTER)	(NITRIF)	(DIG CONSERV.)	(DIG NON-CONS.)	(INHIBITION)	Concentration	Concentration	Loading	(INHIBITION)
	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)	(Cmaxin - mg/l)	(Cmaxino - mg/l)	(Lmaxin - lbs/d)	(lbs/d)
Arsenic	4.8989	-	-	1.8659	-	1.8659	0.004	(5	0.1960	1.8659
Cadmium	57.6343	-	-	17.7848	-	17.7848	0.0025		0.1225	17.7848
Chromium	67.1084	-	-	49.3077	-	49.3077	0.042		2.0575	49.3077
Copper	62.8066	-	-	15.5252	-	15.5252	0.113		5.5358	15.5252
Cyanide	6.7108	-	-	-	2.1723	2.1723	0.008		0.3919	2.1723
Lead	113.9283	-	-	138.5050	-	113.9283	0.014		0.6858	113.9283
Mercury	5.4432	-	-	-		5.4432	0.0001		0.0049	5.4432
Molybdenum	-	-	-	-		-	0.006		0.2939	-
Nickel	56.9641	-	-	4.4654		4.4654	0.62		30.3733	30.3733
Selenium	-	-		-	•	-	0.01		0.4899	-
Silver	15.3091	-		5.3487	•	5.3487	0.008		0.3919	5.3487
Zinc	20.1325	-		279.0594	•	20.1325	0.9897		48.4846	48.4846
Ammonia	23514.7968	-		-	•	23514.7968	-		-	23514.7968
BOD	-		•	-	-	-	182.8		8955.2184	
TSS	•			-	-	-	234		11463.4634	-
Phosphorus (T)	-		-	-	-	-	-		-	-
Nitrogen (T)	-		-	-	-	-	-		-	-
Beryllium	-	-	•	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	•	-	-	-	-		-	-
	-	-	•	-	-	-	-		-	-
	-	-	•	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	=	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	=	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-

AHL (ACT. SLUDGE) = AHL (TRICK. FILTER) = AHL (NITRIF.) = AHL (DIG. - CONSERV.) = AHL (DIG. - NON-CONS.) = Most Stringent (INHIBITIÓN)

(Cmaxin) (Cmaxino)

(Lmaxin) Lmaxin = 8.34 (Qpotw)

AHL (INHIBITION) =

Allowable Headworks Loading based on inhibition of the activated sludge treatment units from Table 8, column F.

Allowable Headworks Loading based on inhibition of the trickling filter treatment units from Table 9, column F. Allowable Headworks Loading based on inhibition of the nitrification treatment units from Table 10, column F.

Allowable Headworks Loading based on inhibition of the anaerobic digester treatment units for conservative pollutants from Table 11 column F.

Allowable Headworks Loading based on inhibition of the anaerobic digester treatment units for non-conservative pollutants from Table 12, column G.

Lowest value for each pollutant from columns B through F.

Maximum Influent Concentration (from 'Monitoring Data' worksheet, row 44).

Maximum Influent Concentration observed at treatment plant but not listed (or eliminated from) 'Monitoring Data' worksheet (user entered).

Maximum Influent Loading (calculated).

8.34 \* Cmaxin \* Qpotw; where Cmaxin is the greater of Cmaxin and Cmaxino.

Unit conversion factor

POTW's average flow in MGD (from Table 2(b), cell B34).

Highest value for each pollutant from column G or J.

Red Bold in column K indicates that the allowable headworks loading is based on the maximum influent loading.

TABLE 14 - Allowable Headworks Loadings Based on Land Application Sludge Disposal

	LOCAL LIMITS CAL	CULATIONS DATA			MAXIMUM
					LOADING
	POTW	Sludge Flow	Land Application	Removal	Allowable
Pollutant	Flow	to Disposal	Standard	Efficiency	Headworks Loading
	(MGD)	(MTD)	(mg/kg)	(%)	(lbs/day)
	(Qpotw)	(Qsldg)	(Cslcrit)	(Rpotw)	(AHLlas)
Arsenic	5.874	0.91	41	26.46	0.3102
Cadmium	5.874	0.91	39	34.70	0.2250
Chromium	5.874	0.91		81.36	-
Copper	5.874	0.91	1500	79.50	3.7772
Cyanide	5.874	0.91		69.00	•
Lead	5.874	0.91	300	75.75	0.7929
Mercury	5.874	0.91	17	60.00	0.0567
Molybdenum	5.874	0.91	75	17.00	0.8833
Nickel	5.874	0.91	420	69.11	1.2168
Selenium	5.874	0.91	100	3.17	6.3107
Silver	5.874	0.91		75.00	•
Zinc	5.874	0.91	2800	44.23	12.6733
Ammonia	5.874	0.91		-	-
BOD	5.874	0.91		91.25	-
TSS	5.874	0.91		84.38	•
Phosphorus (T)	5.874	0.91		-	
Nitrogen (T)	5.874	0.91		-	•
Beryllium	5.874	0.91		-	-
	5.874	0.91		-	-
	5.874	0.91		-	-
	5.874	0.91		-	1
	5.874	0.91		-	-
	5.874	0.91		-	-
	5.874	0.91		-	-
	5.874	0.91		-	-
	5.874	0.91		-	-
	5.874	0.91		-	-
	5.874	0.91		-	-
	5.874	0.91		-	-
	5.874	0.91		-	-
	5.874	0.91		-	-
	5.874	0.91		-	-
	5.874	0.91		-	-
	5.874	0.91		-	-
	5.874	0.91		-	-
	5.874	0.91		-	-
	5.874	0.91		-	-

(Qpotw) (Qsldg) (Cslcrit) POTW's average flow in MGD (from Table 2(b), cell B34).

Average sludge flow to disposal in dry metric tons per day (from Table 2(b), cell E34).

Applicable sludge standard in mg/kg dry sludge (exceptional quality standard for land application or user entered). (Rpotw)

Removal efficiency across POTW as a percent (from Table 3, column E).

(AHLlas) Allowable headworks pollutant loading to the POTW in pounds per day based on land application sludge disposal (lbs/day - calculated).

ÀhLlas = (0.0022 \* Cslcrit \* Qsldg) / (Rpotw/100)

0.0022 Unit conversion factor

TABLE 15 - Allowable Headworks Loadings Based on Incineration Sludge Disposal

	LOCAL LIMITS CA	LCULATIONS DATA								MAXIMUM LOADING
Pollutant	Sludge Flow to Incineration (MTD) (Qinc)	Incinerator Dispersion Factor (ug/m³/g/sec) (DF)	Incinerator Control Efficiency (%) (CE)	Risk Specific Concentration (ug/m³) (RSC)	National Ambient Air Quality Standard (ug/m³) (NAAQS)	National Emission Standard (g/d) (NESHAP)	Incineration Standard (mg/kg) (Cslcrit)	Sludge Flow to Disposal (MTD) (Qsldg)	Removal Efficiency (%) (Rpotw)	Allowable Headworks Loading (lbs/day) (AHLis)
Arsenic	0			-	-	-	-	0.91	26.46	-
Cadmium	0	-		-	-	-	-	0.91	34.70	-
Chromium	0	-			-	-	-	0.91	81.36	-
Copper	0	-	-	-	-	-	-	0.91	79.50	-
Cyanide	0	-	-	-	-	-	-	0.91	69.00	-
Lead	0	-		-	-	-	-	0.91	75.75	-
Mercury	0	-		-	-	-	-	0.91	60.00	-
Molybdenum	0	-	-	-	-	-		0.91	17.00	-
Nickel	0	-		-	-	-	-	0.91	69.11	-
Selenium	0	-	-	-	-	-		0.91	3.17	-
Silver	0	-	-	-	-	-	-	0.91	75.00	-
Zinc	0	-	-	-	-	-		0.91	44.23	-
Ammonia	0	-	-	-	-	-		0.91	-	-
BOD	0	-	-	-	-	-		0.91	91.25	-
TSS	0	-		-	-	-		0.91	84.38	-
Phosphorus (T)	0	-	-	-	-	-	_	0.91	-	-
Nitrogen (T)	0	-	-	-	-	-		0.91	-	-
Beryllium	0	-		-	-			0.91		
2017	0	-		-	-	-		0.91	-	_
	0	-	-	-	-	-		0.91	-	_
	0			-	-	-	-	0.91	-	_
	0	-		-	-	-	-	0.91	-	_
	0	-	-	-	-	-		0.91	-	-
	0	-	:	-	-	-		0.91	-	-
	0	-		-	-	-	-	0.91	-	_
	0		-	-	-	-		0.91	-	_
	0		-	-	-	-	-	0.91	-	_
	0		-	-	-	-		0.91	-	_
	0		-		-	-		0.91	-	-
	0		-	-	-	-	-	0.91	-	-
	0		-	-		-	-	0.91		-
	0		-		-	-	-	0.91		-
	0		-	-	-	-	-	0.91		-
	0		-				<u> </u>	0.91	-	-
	0		-	-	-	-	<u> </u>	0.91		-
	0			-	-	-	-	0.91	-	-
	0		-	-	-	-	-	0.91		-
<u> </u>	0		<u>-</u>	-	-	-	<u>-</u>	0.91	-	-

(Qinc) (DF) (CE) Average sludge flow to incineration in dry metric tons per day (from Table 2(b), cell M34).

Incinerator dispersion factor in ug/m³/g/sec (user entered in cell C732, from cell C732 for all other cells in this column). Incinerator control efficiency for the pollutant as a percent (user entered).

Risk specific concentration limit in ug/m³ (from 40 CFR 503.43(d) - Table 1 for arsenic, cadmium, and nickel; Table 2 for chromium; chromium user entered). National ambient air quality standard in ug/m³ (from 40 CFR 50.12 for lead). National emission standard in g/d (from 40 CFR 61.52(b) for mercury and 40 CFR 61.32(a) for beryllium). (RSC) (NAAQS)

(NESHAP)

(Cslcrit) Applicable sludge standard in mg/kg dry sludge (calculated based on RSC, NAAQS, or NESHAP - see individual cells for formulas or Appendix T of EPA local limits guidance manual).

86400 Unit conversion factor

(Qsldg) Average sludge flow to disposal in dry metric tons per day (from Table 2(b), cell E34).

Removal efficiency across POTW as a percent (from Table 3, column E). (Rpotw)

(AHLis) Allowable headworks pollutant loading to the POTW in pounds per day based on incineration sludge disposal (lbs/day - calculated).

ÀHLis = (0.0022 \* Cslcrit \* Qsldg) / (Rpotw/100)

0.0022 Unit conversion factor

#### 10/17/2019 **POTW Name:**

#### **Local Limits Calculation**

TABLE 16 - Comparison of Allowable Headworks LoadingsBased on Sludge Disposal

			Hauled Waste Concentration	Hauled Waste Flow	Hauled Waste Loading	Allowable
Pollutant	AHL	AHL	to Sludge Processing	to Sludge Processing	to Sludge Processing	Headworks Loading
	(LAND APPL.)	(INCINERATION)	(mg/l)	(MGD)	(lbs/day)	(SLUDGE)
	(lbs/day)	(lbs/day)	(Chws)	(Qhws)	(Lhws)	(lbs/d)
Arsenic	0.3102	-	-	0	0.0000	0.3102
Cadmium	0.2250	-	-	0	0.0000	0.2250
Chromium	-	-	-	0		-
Copper	3.7772	-	-	0	0.0000	3.7772
Cyanide	-			0	0.0000	-
Lead	0.7929		1	0	0.0000	0.7929
Mercury	0.0567	-		0		0.0567
Molybdenum	0.8833	-	-	0		0.8833
Nickel	1.2168	-		0	0.0000	1.2168
Selenium	6.3107	-		0		6.3107
Silver	-	-		0	0.0000	-
Zinc	12.6733	-		0		12.6733
Ammonia	-	-	-	0		
BOD	-			0	0.0000	-
TSS	-			0	0.0000	-
Phosphorus (T)	-	-	•	0	0.0000	-
Nitrogen (T)	-	-		0		-
Beryllium	-	-		0	0.0000	-
	-	-		0	0.0000	-
	-	-		0		-
	-	-	-	0		-
	-	-		0	0.0000	1
	-	-		0	0.0000	
	-	-		0		-
	-	-		0		•
	-	-	-	0		
	-		-	0		•
	-	-		0	0.0000	-
	-	-		0		-
	-	-	-	0		-
	-	-		0		-
	-	-		0		-
	-	-		0		-
	-	-	-	0		-
	-	-		0		-
	-	-	-	0	0.0000	-
	-	-	-	0	0.0000	-

AHL (LAND APPL.) = Allowable Headworks Loading based on land application sludge disposal from Table 14, column F. Allowable Headworks Loading based on incineration sludge disposal from Table 15, column L. AHL (INCINERATION) =

(Chws) Average concentration for a particular pollutant in mg/l for hauled waste discharged to the sludge processing units (from 'Monitoring Data' worksheet, row 43).

(Qhws) Average flow in MGD for hauled waste discharged to the sludge processing units (from Table 2(b), cell L34). (Lhws)

Average loading to the POTW for a particular pollutant in pounds per day for hauled waste discharged to the sludge processing units (calculated).

8.34 \* Chws \* Qhws

Allowable Headworks (SLUDGE) Lowest value for each pollutant from column B and C minus the hauled waste loading discharged to sludge processing (Lhws).

TABLE 17 - Comparison of Allowable Headworks Loadings

Pollutant	AHL (WATER QUALITY) (lbs/day)	AHL (INHIBITION) (lbs/d)	AHL (SLUDGE) (lbs/d)	Design Loading (lbs/d)	Maximum Allowable Headworks Loading (MAHL - lbs/d)
Arsenic	213.1937	1.8659	0.3102	-	0.3102
Cadmium	3.8363	17.7848	0.2250	-	0.2250
Chromium	-	49.3077	-	-	49.3077
Copper	98.0208	15.5252	3.7772	-	3.7772
Cyanide	84.4458	2.1723	-	-	2.1723
Lead	135.0005	113.9283	0.7929	-	0.7929
Mercury	1.9598	5.4432	0.0567	-	0.0567
Molybdenum	-	-	0.8833	-	0.8833
Nickel	1595.9131	30.3733	1.2168	-	1.2168
Selenium	41.2517	-	6.3107	-	6.3107
Silver	25.3580	5.3487	-	-	5.3487
Zinc	302.5635	48.4846	12.6733	-	12.6733
Ammonia	-	23514.7968	-	-	23514.7968
BOD	-	-	-	-	-
TSS	-	-	-	-	-
Phosphorus (T)	-	-	-	-	-
Nitrogen (T)	-	-	-	-	-
Beryllium	-	-	-	-	-
-	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-

AHL (WATER QUALITY) = AHL (INHIBITION) = AHL (SLUDGE) =

Allowable Headworks Loading based on protection of water quality from Table 7, column F. Allowable Headworks Loading based on prevention of inhibition from Table 13, column K. Allowable Headworks Loading based on protection of sludge quality from Table 16, column G. Design Loading of POTW treatment plant (user entered).

MAHL

Maximum allowable headworks loading is the lowest value for each pollutant from columns B through E.

10/17/2019 **POTW Name:** 

#### **TABLE 18 - Calculation of Local Limit**

#### **Local Limits Calculation**

	Maximum	Safety	Growth	Nonindustrial	Nonindustrial	Nonindustrial	Hauled Waste to	Hauled Waste to	Hauled Waste to	Allowable	Calculated	Basis
Pollutant	Allowable	Factor	Allowance	Concentration	Flow	Loading	Influent Concentration	Influent Flow	Influent Loading	Industrial	Local Limit	of
	Headworks	(%)	(%)	(mg/l)	(MGD)	(lbs/day)	(mg/l)	(MGD)	(lbs/day)	Loading	(mg/l)	Limitation
	(MAHL - lbs/d)	(SF)	(GA)	(Cback)	(Qback)	(Lback)	(Chwi)	(Qhwi)	(Lhwi)	(MAIL - lbs/day)	(Cind)	į į
Arsenic	0.3102	10	10	0.0006	5.507	0.0276	-	0	0.0000	0.2206	0.0721	Sludge
Cadmium	0.2250	10	10	0.0003	5.507	0.0115	-	0	0.0000	0.1685	0.0551	Sludge
Chromium	49.3077	10	10	0.0017	5.507	0.0769	-	0	0.0000	39.3692	12.8625	Inhibition
Copper	3.7772	10	10	0.0375	5.507	1.7223	-	0	0.0000	1.2994	0.4245	Sludge
Cyanide	2.1723	10	10	0.0053	5.507	0.2437	-	0	0.0000	1.4941	0.4882	Inhibition
Lead	0.7929	10	10	0.0019	5.507	0.0873	-	0	0.0000	0.5470	0.1787	Sludge
Mercury	0.0567	10	10	0.0001000	5.507	0.0046	-	0	0.0000	0.0408	0.0133	Sludge
Molybdenum	0.8833	10	10	0.0025	5.507	0.1141		0	0.0000	0.5926		Sludge
Nickel	1.2168	10	10	0.0043	5.507	0.1990	-	0	0.0000	0.7744		Sludge
Selenium	6.3107	10	10	0.0027	5.507	0.1225	-	0	0.0000	4.9260	1.6094	Sludge
Silver	5.3487	10	10	0.0007	5.507	0.0321	-	0	0.0000	4.2468		Inhibition
Zinc	12.6733	10	10	0.1172	5.507	5.3813	-	0	0.0000	4.7574		Sludge
Ammonia	23514.7968	10	10		5.507	0.0000	-	0	0.0000	18811.8374	6146.0926	Inhibition
BOD	-			103.5333	5.507	4755.1183	-	0	0.0000	-	-	-
TSS	-			146.3333	5.507	6720.8529	-	0	0.0000	-	-	-
Phosphorus (T)	-			-	5.507	0.0000	-	0	0.0000	-	-	-
Nitrogen (T)	-			-	5.507	0.0000	-	0	0.0000	-	-	-
Beryllium	-			-	5.507	0.0000	-	0	0.0000	-	-	-
	-			-	5.507	0.0000		0	0.0000	-	-	-
	-			-	5.507	0.0000	-	0	0.0000	-	-	<u> </u>
	-			-	5.507	0.0000	-	0	0.0000	-	-	-
	-			-	5.507	0.0000	-	0	0.0000	-	-	-
	-			-	5.507	0.0000	-	0	0.0000	-	-	-
	-			-	5.507	0.0000		0	0.0000	-	-	-
	-			-	5.507	0.0000	-	0	0.0000	-	-	<u> </u>
	-			-	5.507	0.0000	-	0	0.0000	-	-	-
	-			-	5.507	0.0000	-	0	0.0000	-	-	-
	-			-	5.507	0.0000	-	0	0.0000	-	-	-
	-			-	5.507	0.0000	-	0	0.0000	-	-	-
	-			-	5.507	0.0000	-	0	0.0000	-	-	-
	-			-	5.507	0.0000	-	0	0.0000	-	-	-
	-			-	5.507	0.0000	-	0	0.0000	-	-	-
	-			-	5.507	0.0000	-	0	0.0000	-	-	-
	-			-	5.507	0.0000	-	0	0.0000	-	-	-
	-			-	5.507	0.0000	-	0	0.0000	-	-	-
	-			-	5.507	0.0000	-	0	0.0000	-	-	-
	-			-	5.507	0.0000	-	0	0.0000	-	-	<u> </u>

(MAHL) Maximum allowable headworks loading (from Table 17, column F).

(SF) Safety factor as a percent (user entered).

(GA) Growth allowance as a percent (user entered).

(Cback) Average nonindustrial background concentration for a particular pollutant in mg/l (from 'Monitoring Data' worksheet row 43 or user entered). (Qback)

Average nonindustrial background flow in MGD (calculated).

Qback = Qpotw - Qind - Qhwi (values from Table 2(b), cells B34, C34, and K34)

(Lback) Average nonindustrial background loading to the POTW for a particular pollutant in pounds per day (calculated).

Lback = 8.34 \* Cback \* Qback 8.34 Unit conversion factor

(Chwi) Average concentration for a particular pollutant in mg/l for hauled waste discharged at the POTW influent (from 'Monitoring Data' worksheet, row 43).

(Qhwi) Average flow in MGD for hauled waste discharged at the POTW influent (from Table 2(b), cell K34).

Average loading to the POTW for a particular pollutant in pounds per day for hauled waste discharged at the POTW influent (calculated). (Lhwi)

Lhwi = 8.34 \* Chwi \* Qhwi

(MAIL) Maximum Allowable Industrial Load (calculated).

MAIL = MAHL - (MAHL \* SF/100) - (MAHL \* GA/100) - Lback - Lhwi

(Cind) Industrial allowable local limit for a given pollutant in mg/l (calculated).

Cind = (Qind)

Average discharge flow of Industrial Users to be regulated through the local limits in MGD (from Table 2(b), cell C34).

Basis of Limitation An identification of the lowest allowable headworks loading from Table 17 columns B through D.

Red Bold in column C or D indicates a safety factor or growth allowance of less than 10%.

Table 19 - Comparison of Existing and Calculated Local Limits

POTW Adopting	POTW Adopting
MAIL	Uniform Concentration

Pollutant	Existing Allowable Industrial Loading (lbs/d)	Calculated Allowable Industrial Loading (lbs/d)	Calculated Uniform Concentration Limit (mg/l)	Existing Local Limit (mg/l)	Proposed Local Limit (mg/l)	Other Issues?		Basis of "Need Limit?	?"
	(MAILex)	(MAIL)	(mg/l) (Cind)	(Cind-ex)			Existing Limit	Avg Inf Loading	Max Inf Loading
Arsenic		0.2206	0.0721	0.11	0.07				
Cadmium		0.1685	0.0551	0.11	0.05				
Chromium		39.3692	12.8625	12.2	12.8				
Copper		1.2994	0.4245	0.69	0.42				
Cyanide		1.4941	0.4882	0.12	0.48				
Lead		0.5470	0.1787	0.17	0.17				
Mercury		0.0408	0.0133	0.016	0.013				
Molybdenum		0.5926	0.1936		Report				
Nickel		0.7744	0.2530	0.22	0.25				
Selenium		4.9260	1.6094	1.36	1.6				
Silver		4.2468	1.3875	0.56	1.38				
Zinc		4.7574	1.5543	1.99	1.55				
Ammonia		18811.8374	6146.0926			Need Limit?		Х	Х
BOD		-	-	729	729				
BOD TSS		-	-	771	771				
Phosphorus (T)		-	-						
Nitrogen (T)		-	-						
Beryllium		-	-						
		-	-						
		-	-						
		-	-						
		-	-						
		-	-						
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		-	-						
		-	-						

(MAILex) = (MAIL) = (Cind) =

(Cind-ex) =

Existing Maximum Allowable Industrial Load from previously approved local limits evaluation (user entered).

Calculated Maximum Allowable Industrial Load (from Table 18, column K).

Newly calculated local limit for a given pollutant in mg/l (from Table 18, column L).

Existing local limit for a given pollutant in mg/l from previously approved local limits evaluation (user entered).

Brown bold in column C or D indicates that the calculated allowable industrial loading or local limit is less stringent than the existing loading or limit.

Green bold in column C or D indicates that the calculated allowable industrial loading or local limit is new or more stringent than the existing loading or limit.

Red bold in column F indicates that the proposed local limit is less stringent than the calculated limit.

"Need Limit?" in column G and "Need Limit?" in column G and "Need Limit?" in column G and "X" in "Existing Limit" column (column H) indicates that a local limit exists but no limit was proposed based on the new evaluation.

"X" in "Avg Inf Loading" column (column I) indicates that the average influent loading is greater than 60% of the MAHL (80% for Ammonia, BOD, TSS, Phosphorus, and Nitrogen if the MAHL is based on the design loading) (from Table 20 column D).
"X" in "Max Inf Loading" column (column J) indicates that the maximum influent loading is greater than 80% of the MAHL (100% for Ammonia, BOD, TSS, Phosphorus, and Nitrogen if the MAHL is based on the design loading) (from Table 20 column F).

"EPA Public Notice" in column G Indicates that the newly proposed local limit is less stringent that the existing local limit and therefore EPA would need to publish a public notice in the local paper prior to approval.

TABLE 20 - Comparison of Allowable Headworks Loadings And Current Influent Loadings

	Maximum	Average	Average	Maximum	Maximum
Pollutant	Allowable	Influent	Percent	Influent	Percent
	Headworks Loading	Loading	Loaded	Loading	Loaded
	(MAHL - lbs/d)	(Linav - lbs/day)	(%)	(Linmax - lbs/d)	(%)
Arsenic	0.3102	0.0439	14.1475	0.1960	63.1700
Cadmium	0.2250	0.0444	19.7378	0.1225	54.4327
Chromium	49.3077	1.0631	2.1560	2.0575	4.1729
Copper	3.7772	2.8227	74.7309	5.5358	146.5591
Cyanide	2.1723	0.1421	6.5400	0.3919	18.0414
Lead	0.7929	0.3099	39.0869	0.6858	86.5016
Mercury	0.0567	0.0049	8.6365	0.0049	8.6365
Molybdenum	0.8833	0.2049	23.2013	0.2939	33.2767
Nickel	1.2168	3.3660	276.6349	30.3733	2496.2571
Selenium	6.3107	0.1510	2.3930	0.4899	7.7629
Silver	5.3487	0.1125	2.1026	0.3919	7.3272
Zinc	12.6733	14.3995	113.6201	48.4846	382.5715
Ammonia	23514.7968	-	-	-	-
BOD	-	3926.7145	-	8955.2184	-
TSS	-	4805.6033	-	11463.4634	-
Phosphorus (T)	-	-	-	-	-
Nitrogen (T)	-	-	-	-	-
Beryllium	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	=
	-	-	-	-	-
	-	-	-	-	-
	-	-	=	-	=
	-	-	-	-	
	-	-	-	-	-
	-	-	-	•	-
	-	-	-	-	-
	-	-	-		=
	-	-	-		-
	-	-	-	-	-
	-	-	-	•	-
	-	-	-	-	-
	-	-			

(MAHL) Maximum Allowable Headworks Loading (from Table 17 column B). (Linav) Average influent loading from 'Monitoring Data' worksheet row 47.

Average Percent Loaded = (Linav)/(MAHL)\*100

(Linmax) Maximum Influent Concentration converted to a loading using the POTW flow (from Table 2(b), cell B34).

Linmax = 8.34 \* (Cinmax) \* (Qpotw)

(Cinmax) Maximum Influent Concentration (from 'Monitoring Data' worksheet row 44)

(Qpotw) POTW's average flow in MGD (from Table 2(b), cell B34).

8.34 Unit conversion factor Maximum Percent Loaded = (Linmax)/(MAHL)\*100

Green bold indicates that the average percent loaded is greater than 60% or the maximum percent loaded is greater than 80% for all pollutants except for Ammonia, BOD, TSS, Phosphorus, and Nitrogen where the MAHL for these pollutants is based on the design loading. Where the MAHL for Ammonia, BOD, TSS, Phosphorus, and Nitrogen is based on the design loading, green bold indicates that the average percent loaded is greater than 80%.

Red bold indicates that the percent loaded (average or maximum) is greater than 100%.

#### POTW Name: 10/17/2019

#### **Local Limits Calculation**

TABLE 21 - Calculation of Influent, Effluent, and Sludge Goals

_	Maximum	POTW	Influent	Allowable	Removal	Effluent	Allowable	Sludge Flow	Sludge
Pollutant	Allowable	Flow	Goal	Headworks Loading	Efficiency	Goal	Headworks Loading	to Disposal	Goal
	Headworks Loading	(MGD)	(mg/l)	(WATER QUALITY)	(%)	(mg/l)	(SLUDGE)	(MTD)	(mg/kg)
	(MAHL - lbs/d)	(Qpotw)	(MAHC)	(AHLwq - lbs/day)	(Rpotw)		(AHLs - lbs/day)	(Qsldg)	
Arsenic	0.3102	5.874	0.0063	213.1937	26.46	3.2003	0.3102	0.91	4
Cadmium	0.2250	5.874	0.0046	3.8363	34.70	0.0511	0.2250	0.91	3
Chromium	49.3077	5.874	1.0065	-	81.36	•	-	0.91	-
Copper	3.7772	5.874	0.0771	98.0208	79.50	0.4101	3.7772	0.91	150
Cyanide	2.1723	5.874	0.0443	84.4458	69.00	0.5344		0.91	-
Lead	0.7929	5.874	0.0162	135.0005	75.75	0.6683	0.7929	0.91	30
Mercury	0.0567	5.874	0.0012	1.9598	60.00	0.0160	0.0567	0.91	1
Molybdenum	0.8833	5.874	0.0180	-	17.00		0.8833	0.91	7
Nickel	1.2168	5.874	0.0248	1595.9131	69.11	10.0645	1.2168	0.91	42
Selenium	6.3107	5.874	0.1288	41.2517	3.17	0.8153	6.3107	0.91	10
Silver	5.3487	5.874	0.1092	25.3580	75.00	0.1294	-	0.91	-
Zinc	12.6733	5.874	0.2587	302.5635	44.23	3.4443	12.6733	0.91	280
Ammonia	23514.7968	5.874	480.0000	=	=	-	-	0.91	-
BOD	-	5.874	-	-	91.25	-	-	0.91	-
TSS	=	5.874	-	=	84.38	-	-	0.91	-
Phosphorus (T)	-	5.874	-	-	-	-	-	0.91	-
Nitrogen (T)	-	5.874	-	-	-	•	-	0.91	-
Beryllium	=	5.874	-	=	=	-	-	0.91	-
	-	5.874	-	-	-	-	-	0.91	-
	-	5.874	-	-	-	-	-	0.91	-
	-	5.874	-	-	-	•	-	0.91	-
	=	5.874	-	=	=	-	-	0.91	-
	=	5.874	-	=	=	-	-	0.91	-
	-	5.874	-	-	-	-	-	0.91	-
	-	5.874	-	-	-	•	-	0.91	-
	-	5.874	-	-	-		-	0.91	-
	=	5.874	-	=	=	-	-	0.91	-
	-	5.874	-	-	-	-	-	0.91	-
	-	5.874	-	=	-	-	-	0.91	-
	-	5.874	-	-	-	-	-	0.91	-
	-	5.874	-	-	-	-	-	0.91	-
	-	5.874	-	-	-	-	-	0.91	-
	-	5.874	-	-	-	-	-	0.91	-
	-	5.874	-	-	-	-	-	0.91	-
	-	5.874	-	-	-		-	0.91	-
	-	5.874	-	-	-	-	-	0.91	-
	-	5.874	-	-	-	-	-	0.91	_

(MAHL) Maximum allowable headworks loading (from Table 18 column B).

(Qpotw) POTW's average flow in MGD (from Table 2(b), cell B34).
(MAHC) Maximum Allowable Headworks Concentration - influent or

Maximum Allowable Headworks Concentration - influent concentration necessary to meet effluent, sludge, and inhibition goals (calculated).

MAHC = MAHL/(Qpotw \* 8.34) 8.34 Unit conversion factor

(AHLwq) Allowable Headworks Loading based on protection of water quality from Table 7, column F.

(Rpotw) Removal efficiency across POTW as percent (from Table 3, column E).

(Effluent Goal) Discharge concentration necessary to meet NPDES limit or water quality standards (calculated)

Effluent Goal = (AHLwq) \* (1-Rpotw/100)/(8.34 \* Qpotw)

(AHLs) Allowable Headworks Loading based on protection of sludge quality from Table 16, column G. (Qsldg) Average sludge flow to disposal in dry metric tons per day (from Table 2(b), cell E34). (Sludge Goal) Sludge standard used in headworks calculations for sludge protection (calculated)

Sludge Goal = AHLs \* (Rpotw/100) / (0.0022 \* Qsldg)

0.0022 Unit conversion factor

Table 22 - Comparison of Influent, Effluent, and Sludge Goals to Monitoring Data

Pollutant	Influent Goal (mg/l) (MAHC)	Number of Influent Measurements	Number of Influent Exceedances	Influent Evaluation	Effluent Goal (mg/l)	Number of Effluent Measurements	Number of Effluent Exceedances	Effluent Evaluation	Sludge Goal (mg/kg)	Number of Sludge Measurements	Number of Sludge Exceedances	Sludge Evaluation
Arsenic	0.0063	24	0	OK	3.2003	18		OIL	41		0	OK
Cadmium	0.0046	23	0	OK	0.0511	22		OK	39		0	OK
Chromium	1.0065	20	0	OK	-	22	C	-	-	21	0	-
Copper	0.0771	21	5	?	0.4101	21	C	OK	1500		0	OK
Cyanide	0.0443	20	0	OK	0.5344	19	(	OK	-	18	0	-
Lead	0.0162	23	0	OK	0.6683	22	C	OK	300		0	OK
Mercury	0.0012	23	0	OK	0.0160	22	C	OK	17		0	OK
Molybdenum	0.0180	6	0	OK	-	5	C	-	75		0	OK
Nickel	0.0248	24	1/	!!!!	10.0645	22	(	OK	420		21	!!!!!!
Selenium	0.1288	23	0	OK	0.8153	22	C	OK	100		0	OK
Silver	0.1092	23	0	OK	0.1294	23	C	OK	-	22	0	-
Zinc	0.2587	19	10	!!!!	3.4443	22	C	OK	2800		20	1111111
Ammonia	480.0000	0	0	-	-	0	C	-	-	0	0	-
BOD	-	21	0	-	-	17	C	-	-	17	0	-
TSS	-	21	0	-	-	17	(	1	-	0	0	-
Phosphorus (T)	-	0	0		-	0	C	\	-	0	0	-
Nitrogen (T)	-	0	0		-	0	C	-	-	0	0	-
Beryllium	-	0	0	-	-	0	C	-	-	0	0	-
	-	0	0	-	-	0	C	-	-	0	0	-
	-	0	0	-	-	0	C	-	-	0	0	-
	-	0	0		-	0	C	1	-	0	0	-
	-	0	0	-	-	0	C	-	-	0	0	-
	-	0	0	-	-	0	C	-	-	0	0	-
	-	0	0		-	0	C	1	-	0	0	-
	-	0	0	-	-	0	C	'	-	0	0	-
	-	0	0	-	-	0	C	-	-	0	0	-
	-	0	0	-	-	0	C	-	-	0	0	-
	-	0	0	-	-	0	C	-	-	0	0	-
	-	0	0		-	0	C	'	-	0	0	-
	-	0	0	-	-	0	C	\	-	0	0	-
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	-	0	0		-	0	(	\	-	0	0	-
	-	0	0		-	0	(	-	-	0	0	-
	-	0	0	-	-	0	C	-	-	0	0	-
	-	0	0	-	-	0	C	-	-	0	0	-
	-	0	0	-	-	0	(	-	-	0	0	-
	-	0	0	-	-	0	C	-	-	0	0	-

Influent concentration necessary to meet effluent, sludge, and inhibition goals (from Table 21, column D). (Influent Goal)

(Effluent Goal) Discharge concentration necessary to meet NPDES limit or water quality standards (from Table 21, column G).

(Sludge Goal) Sludge concentration necessary to meet sludge disposal goals (from Table 21, column J).

As listed in columns C, G, and K; the total number of measurements used in the local limits evaluation, from the 'Monitoring Data' sheet row 42. Number of Measurements

As listed in columns D, H, and L, the number of sample results for that pollutant and monitoring point in the 'Monitoring Data' sheet that exceed the listed goal.

All of the monitoring data is below the goal.

Evaluation = OK 25% or less of all of the monitoring data is above the goal. Evaluation = ?

Number of Exceedances

More than 25% and less than or equal to 50% of all of the monitoring data is above the goal. Evaluation = !!

Evaluation = !!!! More than 50% and less than or equal to 75% of all of the monitoring data is above the goal.

Evaluation = !!!!!! More than 75% of all of the monitoring data is above the goal. Evaluation = "-" There is no goal or no monitoring data was used in the evaluation.